REMARKS

The Examiner is respectfully requested to withdraw the rejections and allow Claims 22-24 and 27- 28 and 31-48, the only claims pending in this application.

Claims 22 and 31 have been amended to specify that the methods are directed towards screening a fluid sample for an at least suspected nucleic acid. Claim 22 has also been amended to specify a step of detecting any binding complexes. Claim 21 has also been amended to replace "substrate" with "array" in the preamble to provide proper antecedent basis for "array surface" as specified in the body of the claim. Support for these amendments may be in the specification, e.g., page 6, lines 9-13.

As no new matter has been added by the above amendments, entry of the above amendments is respectfully requested.

REJECTION UNDER 35 U.S.C. §103(a)

Claims 22, 23, 27, 28, 31, 34, 37, 38 and 44 were rejected again under 35 U.S.C. §103(a) as being unpatentable over Milton (US 6,146,833) over Deeg et al. (US 5,338,688).

Independent Claims 22 and 31

Independent Claims 22 and 31, and the claims that depend therefrom, have been amended to specify that the methods are for screening a fluid sample for an at least suspected nucleic acid. More specifically, these claims specify that such screening includes a fluid sample at least suspected of containing a nucleic acid is expelled onto an array surface by actuating a thermal inkjet head to screen the fluid sample for a nucleic acid.

Thus, in order for the subject claims to be rendered obvious over Milton over Deeg et al., the references must teach or suggest screening a fluid sample for a nucleic acid by expelling a quantity of the fluid sample to be screened onto an array surface by actuating a thermal inkjet head.

However, the Applicants respectfully submit that the cited references either alone or in combination do not teach or suggest screening a fluid sample for a nucleic acid because the references

are directed towards the manufacture of arrays and as such do not teach or suggest screening a fluid sample at least suspected of containing a nucleic acid.

Specifically, Milton teaches reagents and processes for immobilizing biopolymers and biomonomers to a solid support, i.e., preparing or making the arrays- not using an array to screen a fluid sample for a nucleic acid. Generally, Milton et al. teach that these biopolymers and biomonomers are immobilized to the solid support by their interaction with acyl fluoride functionalities present on the surface of the solid support (abstract; col. 3, entirety to col. 4, lines 1-36). Specifically, Milton teaches contacting the acyl fluoride functionalized support with "...a suitably derivitized biopolymer or derivitized biomonomer under conditions which cause the derivitized biomonomer or biopolymer to react with acyl fluoride functionalities" (col. 10, lines 1-4). Thus, Milton teaches the immobilization of a biopolymer or biomonomer to acyl fluoride groups present on a solid support. Milton also teaches "Processes for immobilizing biopolymers to activated solid support surfaces and directly attaching in a step-wise successive manner biomonomer units to a growing biopolymer chain attached to the solid support." (abstract) Accordingly, Milton does not teach or suggest screening a fluid sample by contacting it with an array in the manner claimed as Milton is concerned with the fabrication of an array.

Furthermore, Milton does not even suggest screening a fluid sample in a manner as claimed in the subject claims as Milton is concerned with forming and synthesizing immobilized biopolymers on a substrate surface, i.e., the act of manufacturing or making an array, and not with screening a sample. As such, there is no need to screen a fluid sample of any kind in the invention of Milton, because Milton is concerned with making an array.

Deeg et al. is cited solely for actuating a thermal inkjet head and thus Deeg et al. fail to make up for the deficiencies of Milton et al. Specifically, analogous to Milton et al., Deeg et al. is directed towards using a jet unit (25) to manufacture or make reagent domains (32) on a band (20) (see for example col. 4, lines 37-46) and not to depositing a fluid sample at least suspected of containing a nucleic acid using a thermal inkjet head onto an array to screen the sample for the at least suspected nucleic acid. While Deeg et al. teach that a sample may be delivered downstream from the jet units by sample metering unit (28) to the reagent domains (32), nowhere is it taught or even suggested that these sample metering units are jet units and in fact FIG. 2 of Deeg et al. clearly shows these metering units as different from the jet units shown. Likewise, Deeg et al. also fail to teach or suggest that the sample metering units meter a sample at least suspected of containing a nucleic acid.

Accordingly, Milton and Deeg et al. alone or in combination fail to teach or suggest all the claim limitations of Claims 22 and 31, and the claims that depend therefrom.

Independent Claims 27 and 44

Independent Claims 27 and 44, and the claims that depend therefrom, specify a step of loading a fluid into a thermal inkjet head having an orifice and a firing chamber by contacting the orifice with a fluid in a manner sufficient for the fluid to flow through the orifice and into the firing chamber (see for example page 8, paragraph bridging page 9 which describes this manner of loading a fluid sample into a thermal inkjet firing chamber). However, neither reference teaches or even suggests such a step of loading an inkjet firing chamber.

Milton merely teaches that in making arrays, "...thermal inkjet printing techniques utilizing commercially available jet printers and piezoelectric microjet printing techniques...can be utilized to spot selected solid support surface sites with selected derivative biopolymers." (col. 12, lines 57-62). Accordingly, Milton does not teach or even suggest the method of loading a firing chamber as claimed.

Deeg et al. fails to make up for the deficiencies of Milton as Deeg et al do not teach loading a fluid into a thermal inkjet head having an orifice and a firing chamber by contacting the orifice with a fluid in a manner sufficient for the fluid to flow through the orifice and into the firing chamber. In fact, Deeg et al. teach that the jet chamber 4 of jet 5 is connected, via line 12 with a filter 13, to a reservoir 14 for analytical liquid 6. In other words, Deeg et al. teaches a reservoir from which analytical liquid is transferred to the jet.

Accordingly, Milton and Deeg et al. alone or in combination fail to teach or suggest all the claim limitations of Claims 27 and 44, and the claims that depend therefrom.

Independent Claim 34

Independent Claim 34, and the claims that depend therefrom, specify a method for detecting the presence of a nucleic acid in a fluid sample containing the nucleic acid. In this regard, these claims specify expelling a fluid sample onto an array surface using a thermal inkjet head and detecting the presence of any binding complexes on the array surface between at least one nucleic acid and the nucleic acid in the inkjet head-expelled fluid sample. However, neither of the references alone or in combination teaches or suggests such a method.

As described above, Milton does not teach or suggest any detection steps as Milton is concerned with array fabrication. Furthermore, expelling a fluid sample onto an array surface using a thermal inkjet head and detecting the presence of any binding complexes on the array surface between at least one nucleic acid and the nucleic acid in the fluid sample that has been expelled from the thermal inkjet head is not taught or suggested in Deeg et al. Rather, as described above, Deeg et al. teach a jet unit (25) to manufacture or make reagent domains (32) on a band (20) and not to depositing a fluid sample at least suspected of containing a nucleic acid using a thermal inkjet head onto an array to screen the sample for the at least suspected nucleic acid. Also as noted above, while Deeg et al. teach that a sample may be delivered downstream from the jet units by sample metering unit (28) to the reagent domains (32), nowhere is it taught or even suggested that these sample metering units are jet units and in fact FIG. 2 of Deeg et al. clearly shows these metering units as different from the jet units shown. Likewise, Deeg et al. also fail to teach or suggest that the sample metering units meter a sample at least suspected of containing a nucleic acid, nor does Deeg et al. teach or suggest an array surface having a plurality of nucleic acids stably associated thereon.

Accordingly, Milton and Deeg et al. alone or in combination fail to teach or suggest all the claim limitations of Claims 27 and 44, and the claims that depend therefrom

Accordingly, for at least the reasons described above, a proper *prima facie* case of obviousness under 35 U.S.C. §103(a) cannot be made. As such, the Applicants respectfully request that this rejection be withdrawn.

Claims 24, 32, 33, 35, 36, 39-43 and 45-48 were rejected under 35 U.S.C. §103(a) as being unpatentable over Milton (US 6,146,833) over Deeg et al. (US 5,338,688) in further view of Cornell (US 6,132,030). The Applicants respectfully submit that Claims 24, 32, 33, 35, 36, 39-43 and 45-48 are patentable over these cited references.

Claim 24

Claim 24 depends from Claim 22. As described above, Milton and/or Deeg et al. fail to teach all the claim limitation of Claim 22. As Cornell is cited solely for teaching the use of specific power requirements in determining the heat power density for ejecting from thermal inkjet, Cornell fails to make up for the deficiencies of Milton and Deeg et al.

Claims 32 and 33

Claims 32 and 33 depend from Claim 31. As described above, Milton and/or Deeg et al. fail to teach all the claim limitation of Claim 31. As Cornell is cited solely for teaching the use of specific power requirements in determining the heat power density for ejecting from thermal inkjet, Cornell fails to make up for the deficiencies of Milton and Deeg et al.

Claims 35 and 36

Claims 35 and 36 depend from Claim 34. As described above, Milton and/or Deeg et al. fail to teach all the claim limitation of Claim 34. As Cornell is cited solely for teaching the use of specific power requirements in determining the heat power density for ejecting from thermal inkjet, Cornell fails to make up for the deficiencies of Milton and Deeg et al.

Claims 45-48

Claims 45-48 depend from Claim 44. As described above, Milton and/or Deeg et al. fail to teach all the claim limitation of Claim 44. As Cornell is cited solely for teaching the use of specific power requirements in determining the heat power density for ejecting from thermal inkjet, Cornell fails to make up for the deficiencies of Milton and Deeg et al.

Claims 39-43

In regards to Claims 39-43, for at least reasons analogous to those described above for Claim 34, the Applicants respectfully submit that the cited references do not teach or suggest all of the claimed limitations. Specifically, independent Claim 39, and Claims 40-43 by virtue of their dependency from Claim 39, specify a step of detecting the presence of any double stranded nucleic acids on an array surface wherein a thermal inkjet head has expelled a nucleic acid fluid sample thereon. However, as described above, the cited references fail to teach or suggest such a method.

Furthermore, Claim 39 specifies additional steps not taught or suggested in the cited references: (1) maintaining the sample contacted array under hybridization conditions for a period of time sufficient for any complementary nucleic acids to hybridize to each other, and (2) washing the surface of the array. Milton does not teach or suggest such steps as Milton in concerned with fabricating arrays and thus would not be concerned with (1) maintaining the sample contacted array under

hybridization conditions for a period of time sufficient for any complementary nucleic acids to hybridize to each other, or (2) washing the surface of the array. Deeg et al. is concerned with using a jet unit to manufacture or make reagent domains on a band and further fails to teach or suggest employing nucleic acids at all, whether in regards to a sample that contains a nucleic acid or a nucleic acid array. As Cornell is cited solely for teaching the use of specific power requirements in determining the heat power density for ejecting from thermal inkjet, Cornell fails to make up for the deficiencies of Milton and Deeg et al.

Accordingly, for at least the described above, the Applicants respectfully submit that a proper *prima facie* case of obviousness cannot be made and thus request that this rejection be withdrawn.

CONCLUSION

The applicant respectfully submits that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, please telephone Gordon Stewart at 650 485 2386. The Commissioner is hereby authorized to charge any fees which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-1078, reference no. 10981712-2.

Respectfully submitted,

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